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GENERAL NOTES.

In number 94 of these *Publications* we called attention to an article by Dr. HARTMANN, entitled "A Revision of Rowland's System of Wave-Lengths." Another important article bearing upon the same subject, by Professor KAYSER, appeared in the *Astrophysical Journal* for April.

The *Astrophysical Journal* for April contains also an interesting article by E. C. C. BALY, on the "Spectrum of the Aurora." Mr. BALY brings forth further evidence to show the close correspondence between the spectrum of the Aurora and that of krypton. This was previously pointed out by Professor RUNGE in the *Astrophysical Journal* for December, 1903.

A few years ago Professor BAILY, of Harvard College Observatory, made the interesting announcement that a large number of the stars contained in globular clusters were variables of small range and short period. The number of these stars found reached 509. Recently Professor PICKERING has published (*Harvard College Observatory Circular* No. 78) a list of variables found within the Nebula of *Orion*. A year or two ago Professor WOLF, of Heidelberg, discovered a number of variables in this nebula, but his discoveries remained unconfirmed until an examination of Harvard College photographic plates was made recently. Dr. WOLF's discoveries are not only confirmed, but a number of new variables have been found and Professor PICKERING has published, in the circular mentioned above, a list of 71 stars certainly variable and a second list of 35 stars suspected of variability. These stars lie within an area of 14,458 square minutes of arc, R. A. $5^{\text{h}} 27.7^{\text{m}}$ to $5^{\text{h}} 33.1^{\text{m}}$ and Dec. — $4^{\circ} 0'$ to $6^{\circ} 59'$, and about 3,000 stars were examined.

Mr. CHANDLER has given in the *Astronomical Journal*, No. 560, Ephemerides of Long Period Variables from 1903 to 1910. This includes all the stars of over one hundred days' period contained in CHANDLER's Third Catalogue, and the ephemerides have been computed from the revised elements recently published in the *Astronomical Journal*, No. 553. *M—m* and the

approximate range are given also. Observers will find this publication very serviceable in making up their observing lists.

The numbers of the *Monthly Weather Review* for 1903 contain some interesting articles on the relation between solar and terrestrial disturbances. In the January number may be found "Synchronous Changes in the Solar and Terrestrial Atmospheres," by F. H. BIGELOW; in the August number "The Periodicity of Sun-spots and the Variations of the Mean Annual Temperature of the Atmosphere," by CHARLES NORDMANN; "On the Simultaneous Variations of Sun-spots and of Terrestrial Atmospheric Temperatures," by ALFRED ANGOT; in the October number "Solar Radiations and Earth Temperatures," by C. G. KNOTT; "Studies on the Circulation of the Atmospheres of the Sun and of the Earth," by F. H. BIGELOW; in the November number "Studies on the Circulation of the Atmospheres of the Sun and the Earth, II," "Synchronism of the Variations of the Solar Prominences with the Terrestrial Barometric Pressures and the Temperatures," by F. H. BIGELOW.

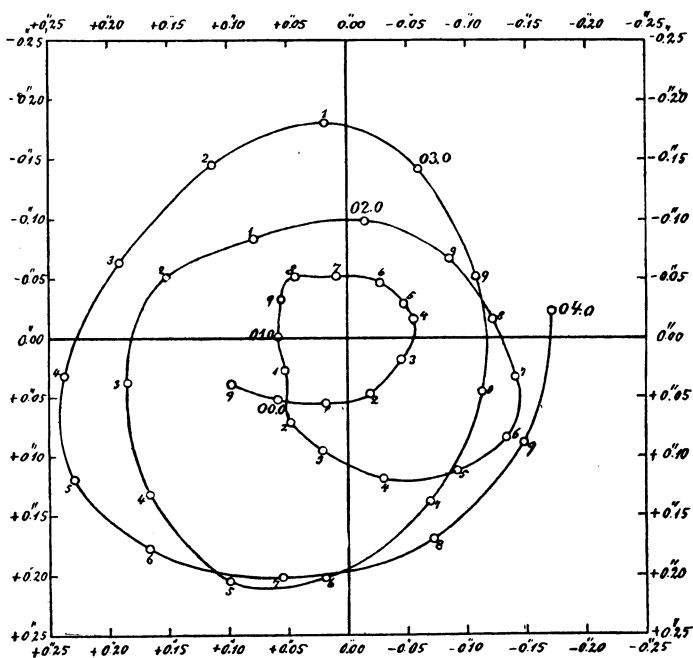
From the annual report of the work accomplished by the Central Bureau of the International Geodetic Association it appears that the number of latitude determinations made at the various stations established for the purpose of determining the variation of latitude, gives a total for 1903 of 12,552, distributed as indicated in the first column of the table given below. The total number of observations made from the time the stations were established, fall of 1899, to the beginning of 1904 is 51,725, distributed as indicated in the second column of the table.

	1903.	Total.
At Mizusawa	1,654	6,683
Tschardjni	2,014	7,454
Carloforte	3,524	13,825
Gaithersburg	1,319	8,017
Cincinnati	1,478	6,709
Ukiah	2,563	9,037

The numbers in the second column indicate something concerning the number of clear nights at the different stations.

At Mizusawa and at Carloforte there are two observers, so that probably every clear night is utilized; it would appear, then, that the Italian has twice as many clear nights as the Japanese station. The advantage of the Italian weather over that of the other stations is not so great, however, as the numbers would indicate, because there is but one observer at each of the other stations, and when such is the case it is not possible to utilize every favorable night. The relatively small number of observations obtained at Cincinnati is due to the fact that Professor PORTER, the observer, has other duties, and gives only a portion of his time to latitude work.

Provisional results for the latitude work of 1903 have been published recently by Professor ALBRECHT in the *Astronomische Nachrichten*, No. 3945. The amplitude of the polar motion has continued large throughout the year, and has probably reached a maximum. The motion of the Earth's north pole, from 1899.9 to 1904.0, referred to the mean position of the pole for 1900-1901, is represented graphically in the accompanying figure, taken from the number of the *Nachrichten* mentioned above.



It is of interest to note that Professor MILNE's suggestion, made as far back as 1893, that earthquakes may be one of the chief causes of the displacement of the Earth's poles, is yearly receiving statistical evidence for its support. (See article by M. A. DE LAPPARENT in *La Nature* for April 16th, or translation in *Literary Digest* for May 14th.) Some time ago Professor MILNE prepared a table showing the proportionality between the number of violent earthquakes and the amplitude of the polar displacement, from 1895 to 1898. More recently this table has been extended to 1902 by M. CANCANI, with the following result:—

Year.	Number of violent earthquakes.	Polar displacement.
1895	9	0".55
1896	18	0 .91
1897	44 or 47	1 .07
1898	50	1 .03
1899	27	0 .72
1900	17	0 .32
1901	22	0 .53
1902	29	0 .97

If the numbers of the second column be divided by the corresponding ones of the first column, it will be seen that a rather rough proportionality exists. The evidence is perhaps not yet sufficient to warrant the conclusion that there is here a relation of cause and effect.

S. D. T.

The following notes have been taken from recent numbers of *Science*:—

Professor HENRY PERROTIN, director of the Observatory at Nice, died recently at the age of fifty-eight.

The Institute of France has received a bequest from M. JEAN DEBROUSSE, yielding an annual income of about \$6,000. A thousand dollars has been appropriated for the publication of a lunar table.

The five-foot equatorial telescope, with Newtonian and Cassegrain mirrors, and many other astronomical and optical instruments belonging to the late Dr. COMMON, are offered for sale by T. A. COMMON, 88 Wigmore Street, London, W.

At a meeting of the National Academy of Sciences held during April Sir WILLIAM HUGGINS and Professor GEORGE H. DARWIN, among others, were elected foreign associates, and the Draper gold medal was presented to Professor GEORGE E. HALE, for his researches in astrophysics.

Miss HELEN SNOW has made a gift of \$10,000 as a memorial to GEORGE W. SNOW, her father, to rebuild the horizontal telescope at Yerkes Observatory, which was injured by fire.

The Carnegie Institution has made a grant of \$1,500 in continuation of last year's grant aiding the new reduction of PIAZZI'S 160,000 star observations. This work, under the direction of Dr. HERMAN S. DAVIS, Gaithersburg, Md., is now well advanced, previous assistance having also been rendered by Miss BRUCE and by the National Academy of Sciences, which continues its aid. A reobservation of all the southern stars of PIAZZI'S catalogue by Professor TUCKER has recently been issued as Volume VI of the *Lick Observatory Publications*, and a similar work for all the northern stars by Professor PORTER will be an early publication of the Cincinnati Observatory. Other co-operators, both in this country and in Italy, are expected to complete the entire work in five years or less. It has now been in continuous progress nearly eight years.

Dr. SIDNEY DEAN TOWNLEY, observer in charge of the International Latitude Observatory at Ukiah, has been appointed Lecturer in Astronomy in the University of California.

The Weather Bureau of the U. S. Department of Agriculture has recently published an important bulletin, "The Climatology of California," by Professor ALEXANDER G. McADIE, Forecast Official in charge of the San Francisco office. This is a quarto volume of 270 pages and contains much valuable information for any one interested in the many climates of this wonderful State. Professor McADIE begins by discussing the controlling factors in the climate of the Pacific Coast, and these are classified under four heads, as follows:—

1. The movements of the great continental and oceanic pressure areas—the so-called permanent "highs" and "lows," as well as the movements of individual pressure areas.

2. The prevailing drift of the atmosphere in temperate latitudes from west to east.

3. The proximity of the Pacific Ocean, with a mean annual temperature near the coast-line of about 55° F., considered as a great natural conservator of heat.

4. The exceedingly diversified topography of the country for a distance of 200 miles from the coast inland.

The balance of work is given up to discussion and data under the following heads: Climate of North and Central Coast; Climate of Southern Coast; Climatology of the Great Valley; Climate of Santa Clara Valley; Local Climatology; General Precipitation Tables; Snowfall; Precipitation at High Levels; Frost, Fog, Thunderstorms, Earthquakes.

A large amount of tabulated data referring to precipitation, pressure, temperature, and wind is given. As might be expected, an almost endless variety of climates may be found in a State which has over five hundred miles of coast-line, coast ranges of mountains, great inland valleys, great deserts, and, a great range of mountains with numerous peaks over 12,000 feet high. The annual precipitation varies from over sixty inches in the north coast counties and high mountain regions to less than two inches in the southeast desert regions. The temperatures vary from the breath of a blast furnace on the desert to the extreme winter cold of the mountain counties.

From the data given for the Lick Observatory we find a mean annual temperature of 52° ; mean temperature for January, 40° ; for July, 69° ; highest temperature (12 years' records), 94° ; lowest, 13° . The mean annual precipitation is thirty-two inches, while that of San Jose, only twelve miles distant in a straight line, is but fifteen inches, which furnishes a very good illustration of the effect of local topography upon the amount of rainfall. This is also strikingly illustrated in the short distance, fifty miles, and comparatively level country between San Jose and San Francisco. The rainfall at San Jose is 15 inches; at Menlo Park, 16.5 inches; at San Mateo, 21 inches; and at San Francisco, 23 inches,—an increase of eight inches in fifty miles, and the increase is nearly in proportion to the distance from San Jose.

Mr. McADIE writes very entertainingly concerning the

climate of San Francisco. We quote but one paragraph: "When a native of San Francisco is asked which is the coldest month of the year, he is generally at a loss for an answer; and if asked which is the warmest he may say November. This confusion arises from the comparatively small range of temperature. The mean annual temperature as determined from the records of the Weather Bureau for thirty-one years is $56^{\circ}.1$ F. May and November have practically the same temperature. The warmest month is September, $60^{\circ}.8$; the coldest is January, $50^{\circ}.2$. The other months have mean temperatures as follows: February, 52° ; March, 54° ; April, 55° ; May, 57° ; June, July, August, 59° ; October, 60° ; November, 56° ; December, 52° ." The highest temperature ever recorded in San Francisco was 100° , and the lowest 29° .

The work is illustrated by numerous maps and charts which are a decided help to the reader, and some excellent photographs of fog as seen from Mt. Tamalpais are also inserted.

The book is a highly creditable production, and Mr. McADIE and those who have worked with him are to be congratulated.

S. D. T.

In *The Observatory* for April, Mr. W. F. DENNING gives four sketches of a sun-spot of January 22d, showing decided changes during periods of several minutes. He recommends as necessary to successful study, almost continuous observation for a number of hours daily, of some selected spot.

The same number of *The Observatory* publishes a count of *Pleiades* stars by Mr. J. E. GORE. The count was limited to an area of three square degrees on a photograph by the Henry Brothers, and gave the following results:—

Magnitude.	Number.	Totals.	Ratio of Totals.
3	1	1	—
4	2	3	3
5	3	6	2
6	5	11	1.83
7	1	12	1.1
8	12	24	2.0
9	18	42	1.75
10	28	70	1.66

Magnitude.	Number.	Totals.	Ratio of Totals.
11	57	127	1.81
12	113	240	1.9
13	157	397	1.65
14	169	566	1.42
15	267	833	1.47
16	448	1281	1.53

In *A. N.* 3917, Herr H. EBERT accounts for the multiple character of the lines in the spectra of new stars by supposing it to be due to "anomalous refraction" in the layers of vapors of different character and density through which the light passes.

The tenth ordinary meeting of the Royal Society of Edinburgh for the present session was held recently in the Royal Institution, Edinburgh—the Rev. Professor FLINT, vice-president, in the chair.

Dr. HALM, assistant astronomer, Royal Observatory, Edinburgh, read a paper on "Spectroscopic Observations of the Rotation of the Sun." These observations were made at the Royal Observatory during the years 1901-1903. The method employed was that of measuring the displacements of certain Fraunhofer lines in the solar spectrum. If the light from two diametrically opposite points of the solar limb was thrown upon the slit of a spectroscope, the dark absorption-lines of the two spectra showed slight differences in their positions. These differences were caused by the rotation of the Sun round his axis, by which the points of the one limb were moved towards us, and those of the opposite limb from us. But, according to a principle first enunciated by DOPPLER, the wave-lengths of the lines must be shortened in the first case, and lengthened in the other. From the measured displacements it then was easy to compute the corresponding rotational velocities. The apparatus arranged by Dr. HALM for these extremely delicate observations permitted of studying the axial rotation in all solar latitudes. As a general result of his investigation the peculiar decrease of angular velocity from the equator towards the poles, first discovered by CARRINGTON from sun-spot measurements, was confirmed. But the main object of the research was to find out whether the law of rotation was subject to

any alterations in the course of an eleven years' sun-spot cycle. The results so far obtained pointed very strongly to the presence of such changes. The values obtained during 1901-1902, at a decided minimum of solar activity, appeared to be materially different from those of 1903, when a new solar cycle was initiated by vigorous displays of spots and eruptions. Thus, to take one instance, a point in 60 degrees solar latitude completed a revolution round the solar axis in 36.2 days in 1901-1902, but such a point only required 29.2 days in 1903 to describe a full circle. Changes of such magnitude in the law of rotation were an entirely novel feature of the complex mechanism of the Sun. Dr. HALM pointed out the necessity of a continuation of his observations, and expressed the hope that other observatories might be induced to take up similar investigations under more favorable atmospheric conditions.

—*Extract from the Scotsman.*
